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ABSTRACT

John Carroll's concept of mastery learning (ML) is described, and an ML model which can be used by directors of music-performing groups is presented. According to Carroll, any student, when given direction and time to follow that direction, can move along a time line from a state of inability to a state of ability. Tasks defined in behavioral terms allow both the teacher and the student to judge when the task is completed. When time needed to learn a task equals time spent in learning, the learner is able to perform the task. Proponents of ML feel that 90 to 95% of all students can achieve mastery if proper teacher and student conditions for learning are present. Using Benjamin Bloom's model of ML and recommendations from other educators, a two part model--Planning for Learning and The Learning Experience--is presented. A discussion covering the following topics follows the model: establishing current performance levels, selecting new material, selecting instructional content, planning for instruction, planning for evaluation, planning for prescriptive design, and learning sequence. (RM)

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Mastery Learning and Musical Performance Groups

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Mastery Learning and Musical Performance Groups

The Development of Mastery Learning

In 1963 John Carroll published an article on school learning.[1] The concepts he presented have led to a philosophy of teaching now referred to as mastery learning (M.L.). Proponents of this philosophy have made field studies with significant implications for educators. These studies have, however, been somewhat limited in scope to basics in education with little work being done in the arts.[2] It is the purpose of this article to describe Carroll's concept of learning, to follow its development, and to present a possible model for music performing groups.

Carroll's Learning Strategy

In his strategy for learning, Carroll begins with a discussion of the learner's task. This task is viewed on a time continuum referred to by Carroll as a time line. The task begins at a point of inability and moves along the time line until the student is able to perform at the level prescribed by the teacher. In order for the student to move along Carroll's time line the learning task must be clearly defined. Tasks defined in behavioral terms allow both the teacher and the student to judge when the task is completed. This approach allows Carroll to present a premise that forms the foundation of M.L. He concludes that almost any student, when given direction and time to follow that direction can move from a state of inability to a state of ability.[3] This is clearly a departure from traditional programs in which approximately twenty percent or one-fifth of a group generally achieve the level of mastery discussed by Carroll. Rather than twenty percent, proponents of M.L. feel that ninty to ninty-five percent of all students can achieve mastery if proper conditions for learning are present.[4]

By describing a student's progress along the time line Carroll presents the conditions that exist when learning occurs. Movement along the continuum is measured in incremants of time needed to learn and time spent in learning. When time needed to learn a task equals time spent in learning the learner is able to perform the task. Conversely when either side is

out of balance a state of underachievement or overachievement is experienced.

Carroll describes five components that affect student progress along the time line--of the five, three relate directly to the student while the remaining two are teacher controlled. Student related components include aptitude (redefined by Carroll as the time the student will need to complete the task under an ideal teaching situation), ability to understand instruction (referring to the general and verbal intelligence of the student) and perseverance (time the student is willing to spend in learning the task). Teacher controlled components include the opportunity to learn (the actual time the student is allowed to learn the task) and the quality of instruction.[5] Teachers can do little to change the three components students bring with them to the class. Perhaps for this reason M.L. seems to be intended to helping the teacher become more effective. In Carroll's strategy the teacher's effectiveness can be described in terms of how well the teacher manages the learning process along the time line. The teacher is effective when time for instruction and learning is planned and implemented making maximal use of time available. The concepts of planning and implementation implied by Carroll's strategy have led to various models of M.L. designed to help the teacher become more effective. Of particular interest to this article are those model that have dealt with group instruction as opposed to individual instruction.

A Model for Mastery Learning

While there are many adaptations and variations to M.L. in group settings all appear to be drawn from a model presented by Benjamin S. Bloom and later summarized in his book All Our Children Learning. Bloom recognizes two primary areas of concern for the teacher, preparing for the learning experience and the learning experience itself.[6]

Preparing for learning

Preconditions, according to Bloom, for M.L. include the following: teacher knowledge of student abilities, specific objective and instructional content, evaluation,and prescriptive design.

Teacher knowledge of student abilities allows the teacher to define and recognize what students are able to do. From this knowledge the teacher can then begin to formulate goals and objectives in terms of instructional content.

Goals and objectives recognize where the learner is and become statements of where the student should be at the conclusion of instruction.

Instructional content is the formulation of plans and lessons designed to help the student reach goals and objectives.

Evaluation is done to determine how well students have achieved goals and objectives. Bloom suggests the use of formative (non-graded) and summative (graded) tests as an effective means of evaluation. Formative tests are designed to provide feedback to both the student and teacher. The student receives feedback in a non-threatening atmosphere (non-graded) and receives specific directions from the teacher. The teacher also receives feedback from the student's performance. Student performance allows the teacher to recognize how well instruction is being received. Formative tests are given at the conclusion of small units of instruction. Bloom suggests that they be given every week to two weeks. Summative tests provide a cumulative indicator of student progress toward the end of the course. Again, feedback is used by both teacher and student. Bloom's use of both summative and formative tests is designed to measure the student's progress against the criterion of class objectives and not as a reflection of class standing. Bloom states, "Students must feel they are being judged in terms of level of performance rather than a normal curve or some other arbitrary and relative set of standards."

Prescriptive design is prepared during planning for learning. It entails plans made to assist non-mastery students (students who have not been able to demonstrate unit objectives through the process of evaluation) and mastery students (students who have demonstrated required abilities). Preparation for non-mastery involves alternate approaches for problems the teacher anticipates. These plans, while remedial in nature, are constructed so that repetitive learning experiences will not bore the student and belabor material presented. Mastery preparations include plans for extending the particular

activity being taught and providing a greater indepth experience for the mastery student. Both remedial and enrichment plans make use of alternate approaches and supplementary materials.

The learning experience

Bloom's purpose of both the preconditioning of the teacher and the presentation of materials is to reduce time required for learning, to insure mastery of material, to affect the quality of instruction, and to affect the student's ability to understand instruction.[7] By preparing for learning, the teacher is able to teach and students are able to learn, the teacher is able to recognize how well the students have learned and can provide additional instruction for the non-mastery students. Mastery students are led into enrichment areas until such time as the class is prepared to enter the next level of instruction.

Adapting Bloom's Model

Block, in an address to the Association of Supervision and Curriculum Development, expanded somewhat on Bloom's model.[8] Block begins with the teachers attitude towards the learner and concludes that the teacher must accept two hypotheses before M.L. can be implemented. The first hypothesis is that most students can master what is to be taught. The second, that the teacher can teach so that all students will learn well. Once the teacher has accepted these hypotheses, planning for learning can begin.

Block suggests that all learning units be based on previously learned material. Such planning allows a hierarchical arrangement to be developed and it sequences student progress from unit to unit. Prior to the teaching experience, and as an introduction to it, Block suggests that students be oriented toward how they will be taught, what they will be taught, and that they be encouraged to master sequential units and use correctives where necessary. The teaching sequence is presented as a cycle beginning with a presentation of material, moves to formative testing, and is completed when students are either recycled or certified as having mastered the material presented.

Block also suggests that upon completion of the cycle, instruction be redesigned using student mastery as a determinant for effective teaching.

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Block suggests mastery of eighty percent of the material by eighty percent of the students as indicative of good instruction. Levels below this are attributed to a breakdown in the instructional process and mandates a restructuring of the learning unit before it is presented again.

Allen Cohen and Joan Hyman suggest that during the preparation for learning stage the teacher prepare for maximally positive feedback. Positive feedback is correlated with more productivity in terms of course outcomes than negative feedback. They further suggest that instruction proceed in small steps (perhaps suggesting units described by Block and Bloom to be too large for functional purposes).[9]

Jerry Klein, in presenting a theoretical model, places much emphasis on selecting the form of instruction to include different types of material delivery (self-instructional resources, teacher, student, and adjunct instructional resources such as media) and student groupings (small group, independent study, and large group presentations).[10]

Anne Auten suggests the use of peer teaching as an effective means of helping non-mastery students attain mastery,[11] and Carol Barber, in reporting on the Denver Public Schools Mastery Learning Program, emphasises an identification of prerequisite skills of learners as a functional part of planning for learning. To determine prerequisite skills, Barber suggests the use of pre-tests to measure mastery of such skills by learners. This leads to the pre-instruction cycle which is designed to bring students to mastery of skills required for the course. Like Cohen and Hyman, Barber also suggests the use of mini-units of instruction.[12]

The Adaptive Model

Using Bloom's model in conjunction with the recommendations presented above, an adaptive model for M.L. has been constructed. The model is presented here in terms of a time line beginning with the "Planning for Learning" stage. Because the model must deal with the spatial relationship existing between teacher and learner it is presented on two levels representing this relationship. Arrows are used to indicate direction and interaction between teacher and student as they progress along the time line (see charts 1 and 2).

Chart 1: Planning for Learning

1) Teacher Attitudes

Teacher adopts view that most students can learn for mastery and that the teacher can teach so that most students can master what is being taught.

2) Student Assessment

Teacher assesses the students ability level from existing information and uses this information to establish goals and objectives.

3) Goals and Objectives

Goals and objectives are defined in terms of behaviors the teacher can observe. Goals and objectives are then hierarchically arranged.

4) Instructional Content

Teacher identifies tasks that will lead to mastery of goals and objectives, plans min learning units to teach tasks, determines type of presentation and size of group to receive presentation, constructs lesson plans that reflect the above stated materials, and plans for positive feedback by identifying specific behaviors that can be verbally described and praised.

5) Evaluation Design

Teacher constructs formative and summative tests that will accurately measure how well students are able to perform skills taught and required for mastery.

6) Prescriptive Design

Plans for non-mastery students are constructed allowing the student time, instruction, and materials to master required tasks.
Plans for mastery students are prepared allowing time, instruction, and enrichment materials to emphasize mastered materials.

Chart 2: The Learning Experience

Step	Teacher	Students	
		non-mastery student	mastery student
1) Prerequisite skills are identified and clarification of objectives are made.	Teacher identifies class expectations and behaviors and administers the prerequisite skills test.		Students are informed of class expectations and are then tested for pre skills.
2) Feedback	Teacher provides feedback to students and prescribes remedial and enrichment materials.	receives correctives in terms of remedial work and is brought to mastery.	receives enrichment materials to supplement prerequisite skills.
3) Teacher presentation of first mini unit.	Teacher provides instruction in terms the student can comprehend and then directs the learning activity.		Students, after receiving instruction, are directed through the task required by the teacher.
4) Feedback	Teacher administers first formative test and provides feedback	receives correctives in terms of remedial work and is brought to mastery	receives enrichment materials to supplement prerequisite skills
5) Teacher presentation of second mini unit.	(steps five and remaining steps are repetitions of three and four and continue to repeat until all material is presented)		
6) Summative test	Teacher administers summative test, provides feedback and restructures program.		

Mastery Learning and Music Performance Groups

For music performance groups, mastery of material to be performed is essential for the edification of the performer, director, and audience. A non-mastery performance frustrates learners, humilates directors, and embarrasses audiences. Planning for mastery is the responsibility of the director. Planning, using the mastery model, can become enjoyable and fullfilling for any director but particularly for that director who has endured the humiliation of poor performance and the animosity of frustrated students and embarassed supporters. The teacher must feel that all students can learn to perform the music selected and that he/she can teach in such a way that mastery is possible.

Establishing Current Performance Levels

Before selecting music for performance the director must first deal with current performance levels of students such as familiar keys, rhythmic and melodic capabilities, and tone production (specifically in terms of range, dynamics, and endurance). To establish current levels the teacher can choose from a number of possible indicators such as previously performed music, method books, and personal familiarity with the performers' abilities. The teacher may also resort to one-on-one auditions as a means of pre-testing students. Obviously this type of testing is time consuming, however, it does provide the most accurate indicator of the performers' abilities.

Establishing the appropriate performance level of a group is not a difficult task for the director who has worked for some time with a given performance group. However, the new director will not find this task an easy one to accomplish. The new director must use every possible source to establish the group's performance level. If this is not done, the director will be overwhelmed by students frustrated by musical demands beyond their abilities or by students bored by a repetitive and, perhaps to them, a demeaning experience. New directors, where possible, would be well advised to meet with previous directors for the specific purpose of determining group performance levels. Other possible sources could include consideration of previously performed programs and informal sight reading sessions.

Selecting New Material.

In selecting new materials the teacher is defining the goals and objectives for the class. The director must be able to distinguish previously learned skills from skills yet to be learned and must hierarchically arrange these skills to avoid confusing the learner. The director must also deal with the time available for learning when selecting new materials. Limited time reduces the teacher's ability to deal with more complex music. Longer periods of time allow the student to progress to higher levels of performance skills.

Instructional Content.

Once a piece has been selected, it is necessary to divide the piece into learnable segments. This is necessitated by the simple fact that few pieces can be learned in one period. Also, as stated in the model, it is desirable to reduce the learning experience to a unit small enough that students can achieve mastery in a relatively short period, thus allowing the student a feeling of accomplishment and the teacher an opportunity to praise the student's achievement. The length of learning segments must be determined by the difficulties the students will encounter. At times segments of one to two measures will provide ample challenge for students, while at other times whole sections may be more appropriate. When faced with the choice of taking more time for two learning units or less time by combining units the first choice is preferred. Units that are too large reduce the possibility of learner success and consequently lead to increased possibilities for frustration. It is a simple process to count the number of segments once they have been identified and begin the process of calendaring for learning. Calendaring is the planning of time available for presenting segments to be learned. A director plans for the number of rehearsals that exist between the first rehearsal and the performance. Such planning allows each segment of each piece the time necessary to allow students to grasp the skills being taught. Adjustments for too much or too little material should be made at this time. When calendaring it is suggested that segments be taught as mini-units of 10-15 minute duration. Longer periods tend to become tedious and to encourage boredom. Three to five

mini-units can be taught depending upon the length of the rehearsal. It is further suggested that these segments be from different pieces in order to allow students both a change of material and pace. Mini-units are generally calendared for sequential presentations. However, a director may first choose to do more difficult segments to allow more time and repetition. One could plan for sequential presentations from beginning to end or from end to beginning--the decision is made by the director as he/she determines the needs of the performers. Time must also be planned for memorization when it is required for performance. It is suggested that each sgement be taught at least three times, thus creating three levels of presentation. The first level deals with rhythms and melody, the second with interpretation, and the third with unifying segments and refining performance skills.

Planning for Instruction.

Having identified mini-units or segments of music to be taught, the director must then determine how best to teach each unit. This is, in part, determined by the music itself, what level of presentation the class is in, and the teaching abilities of the director. As previously mentioned, three presentations are suggested for mastery. The first, dealing with rhythmic and melodic accuracy, best lends itself to creative approaches on the part of the director. Different systems of counting may be taught and applied at this level. Body movement could be encouraged to reinforce both rhythms and melody. Tonal centers must be delt with as key changes occur. The second presentation, dealing with the musicality of the segment, is more restrictive in terms of teacher creativity. Diction, phrasing, and style do, however, allow the director to make artistic interpretations that are unique to the group. The third presentation, discussed as a cumulative event, is restrictive in terms of reinforcing and refining what has previously been taught.

As suggested by Cohen and Hyman, reinforcement in terms of student behaviors should also be planned. The director needs to be able to specifically praise behaviors that are desired and expected from the learner. As such, reinforcement becomes a part of the feedback system that allows students to perceive how the director views what they are doing. Reinforcements are

planned on two levels, the first level includes behaviors that are participatory in nature, e.g., student attendance, attitude, and participation. The second level is given for music behaviors such as starting and stopping together, tone production, melodic and rhythmic accuracy, posture, etc. By planning for reinforcements the director is able to create a positive rehearsal that promotes better performance on the part of students and also a feeling of mutual respect between director and performer.

Planning for Evaluation.

Our model for M.L. includes two types of evaluations, formative and summative. In terms of musical expectations formative tests allow the director to discribe in specific terms what the performer is doing well or not doing well. It is suggested that formative tests be given at the conclusion of each level of presentation. In-as-much-as the first level concentrates on melodic and rhythmic accuracy, and because this level represents the foundation of good performance, it is suggested that when possible this test be administered on a one-to-one basis. This allows the director to provide more specific help to the individual while identifying weaknessesin material presentation. This type of testing is notalways feasible because of time and numbers. Other less desirable options include testing small groups of two to four performers, parts within sections, or complete sections. Obviously the farther the director is removed from the one-on-one basis the less effective he/she becomes in providing specific diagnostic/prescriptive feedback. The level of mastery expected by the director greatly affects later performance. Testing at the first level of presentation must require the highest level of mastery to later produce the highest level of performance.

At the conclusion of the second level of presentation (interpretive) testing is perhaps best done in small groups. Third level feedback must be done in terms of the whole group because of the objective of this presentation. As with first level testing, mastery expectations at second and third level are determined by the director. Obviously all feedback in terms of student performance relates specifically to the objectives stated for each level of preparation. For the director to expect students to perform on a third level ability upon completion of the first level will frustrate both director and performer.

Summative tests for performance groups deal specifically with skills related to performing music. The final summative test then is the final performance of the group which acts as the cumulative event of instruction. Feedback from this test comes in terms of audience response, performe. response, and director response. Of these three, the director's response is most crucial to future performances. Summative feedback can be obtained prior to the final performance by providing less formal performances to audiences that are perhaps less sophisticated than the audience of the final performance. Such pre-performances allows both director and performer a performance experience under less demanding reviews. More important, however, is the feedback that can be directed to the performance group from the director, recordings made of the performance, and selected listeners being asked to critique the group. It is wise to schedule rehearsals between performances. This type of rehearsal allows time for positive feedback and corrective measures. When pre-performances are impractical a similar experience in many respects can be achieved through performing before a tape recorder. Recordings allow the performers the opportunity to become self-analytic and diagnostic. Care must be taken, however, to guard against "bad" recordings that can both discourage and deflate groups. This can occur when recordings are made at levels preceding performance skills and can turn groups against given selections.

Planning for Prescriptive Design.

Directors must be prepared at each level of presentation to help those who can and those who cannot do what has been taught. Too often we become reliant on evaluating progress with those who generally can do what is required. The director creates frustration and inhibits both growth and potential of the non-mastery performer when assistance is not rendered. The frustrated performer could overcome the problem at hand by asking for assistance and direction, however, many students lack the courage to look "dumb" in the eyes of their peers. Sometimes when help is requested, help is not given because the teacher is not prepared to give help or has not planned for enough time to give the help that is needed.

To avoid such frustration the director presents small segments of music that performers can master within the given time period. The student is

tested and the director provides specific feedback that allows the non-mastery student to accomplish the task at hand. Obviously this is a time consuming task. Prescriptive diagnosis is, again ideally given on a one-to-one basis with director and performer. Mastery students, as-well-as older students, parents, or tutors may also provide this feedback under the supervision of the director. While scheduling may restrict time and also the type of testing to be done, this writer has found additional time during lunch periods, before and after school, study halls, free periods, in short any time the director and performer can meet together. Time spent outside the classroom creates more time for classroom participation.

As suggested above, an appropriate activity for the mastery student could include working as a peer tutor for non-mastery students. Care must be taken, however, in preparing a peer tutor with the skills necessary to be effective.[13] Other extension activities for the mastery student could include individual work on solo and ensemble literature in preparation for performances at programs and contests, and studying historical and theoretical concepts of music and composition. The director must select and monitor these supplementary experiences with the individual in mind and may seek help from private teachers and parents. Monitoring extended activities is as critical to this type of experience as it is to the mastery experience. Time must be planned to give instruction and feedback on progress being made. Both remedial and extended activities allow the director to maintain a single group performance level with mastery material, it allows non-mastery students the feedback that encourages and expects mastery, and it allows the mastery student to progress into enrichment areas. By planning for prescriptive design the director more effectively uses student time by meeting individual needs and abilities.

Learning Sequence

At this point the director is prepared to enter the classroom. The learning sequence is simply the implementation of the plan. The effectiveness of the director will be greatly determined by the thoroughness of the plans and the director's ability to follow them. Director effectiveness

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is measured by student mastery. As previously suggested, mastery at the eighty percent level by eighty percent of the students is a positive indicator that the director has prepared well for mastery learning. This will not always occur. When it does not the director may wish to review the following possible causes for failure: instructional segments are too long for time allocated, instructional units are too difficult for abilities of performers, tasks defined in the units do not assist in accomplishing objectives for the unit, formative and summative tests do not measure accurately what needs to be measured, time allotment for presenting materials is not sufficient, time allotment for learning materials is not sufficient, time allotment for demonstrating skills is not sufficient, etc.

It is the authors experience that well executed plans produce mastery at levels between ninety and ninety-five percent. Mastery, by performance groups, does much to prevent individual failure, expects and encourages learning on the part of the performer, strengthens groups in terms of musical skills, and encourages outside support from administrators and parents. When properly implemented M.L. makes the director feel a spirit of accomplishment and reward.

FOOTNOTES

[1]John Carroll, "A Study of School Learning," Teachers College Record, 1963, pp. 723-33.

[2]The writer of this article was able to find only one publication dealing with M.L. and music education (Canelos, J. et al., "Evaluation of Three Types of Instructional Strategy for Learner Acquisition of Interva...," Journal of Research in Music Education, Winter 1980, pp. 245-49). The article reports on a computer-based mastery learning strategy and its application to music education. This research produced significant results, however, it deals primarily with individualized instruction and is not directly applicable to group based education.

[3]Carroll, "A Study of School Learning," pp. 723-24.

[4]Benjamin S. Bloom, Human Characteristics and School Learning (New York: McGraw-Hill Book Co., 1976, pp. 215-26. (In this book, Bloom, in discussing the task of the schools, suggests equality of learning outcomes should be the goal of education rather than the equality of opportunity. From his personal experience he concludes that one to two percent of every class room is constituted of students with exceptional abilities, one to three percent of the students will learn at a slower rate due to heredity, home environmental characteristics, and organic or functional disturbances, and the remaining ninty-five percent of the students form a block where "equality of outcomes is a realistic possibility for most teachers who carefully and systematically apply appropriate instructional means to student differences.")

[5]Carroll, "A Study of School Learning," p. 729.

[6]Bloom, All Our Children Learning: A Primer for Parents, Teachers, and Other Educators (New York: McGraw-Hill Book Co., 1981): pp. 165-71.

[7]Ibid., p. 169.

[8]James H. Block, "Mastery Learning," taped conference session of the Association for Supervision and Curriculum Development, 1976 ("K" St. N.W., Washington, D.C., 2006).

[9]Allan S. Cohen and Joan ... Hyman, "Learning for Mastery: Ten Conclusions after 15 Years and 3000 Schools," Educational Leadership, November 1979, pp. 104-109.

[10]Jerry W. Klein, "Designing A Mastery Learning Program," Educational Leadership, November 1979, pp. 144-47.

[11]Anne Auten, "Masterying Mastery Learning," Journal of Reading, April 1982, pp. 698-701.

[12]Carol Barber, "Training Principals and Teachers for Mastery Learning," Educational Leadership, November 1979, pp. 126-27.

[13]Sophie Bloom, Peer and Cross-age Tutoring in the Schools (Washington, D.C. National Institute of Educat on: U.S. Dept. of Health, Education, and Welfare, 1976. (In this book, Bloom discusses conditions for effective tutoring, the development of classroom tutoring procedures, and training tutors. Much helpful information is available and applicable to the M.L. strategy discussed in this article.)

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